

REMARKS

Claims 1, 8 and 31 have been amended, claims 7, 30 and 32 have been cancelled and claims 33 and 34 have been added. Claims 1 to 6, 8 to 10, 13 to 17, 31, 33 and 34 are pending. Support for the amendments can be found throughout the present patent application including the drawings and claims as originally filed. See notably:

“As shown in Figure 10, front sheet 62 and rear sheet 64 are used for covering the respective front and rear faces 58, 60 of the preformed blade 56 in the construction of a blade 10. The sheets 62, 64 are made of a thermoplastic material selected in the group consisting of polyethylene, polyurethane, polypropylene, polyester, polystyrene, polyvinyl chloride and cellulose acetate. For example, the thermoplastic sheets 62, 64 may be made of thermoplastic polyurethane (TPU) sheets sold by Isosport IS under the name ISOCAP (density of 1.11 gr/cc and hardness of 73D) or sold by Dow Chemical (density of 1.15-1.25 gr/cc and hardness of 73D).” [page 7, lines 16 to 23]

“Because the front and rear surfaces 26, 28 of the blade 10 comprises the layer of thermoplastic material 70, the impact resistance of the blade 10 is greater than that of a blade having no external layer of thermoplastic material. For example, for the same blade construction, drop tests shown that the impact resistance increases of at least 50% for a blade having an external layer formed of a thermoplastic polyurethane (TPU) sheet sold by Isosport IS under the name ISOCAP and at least 70% for a blade having an external layer formed of a thermoplastic polyurethane (TPU) sheet sold by Dow Chemical (density of 1.15-1.25 gr/cc and hardness of 73D)” [page 9, lines 27 to 31, to page 10, lines 1 to 3].

In the Final Office Action, the Examiner rejected claims 1 to 6, 10 and 30 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 5,333,857 (Lallemand); claims 1, 6 to 9 and 13 to 16 under 35 U.S.C. §102(e) as being anticipated by PCT Application WO 03/097181 (McGrath *et al.*); claims 7 to 9, 13, 14, 31 and 32 as being obvious in view of Lallemand; claims 30 and 32 as being obvious in view of Lallemand in light of U.S. Patent 4,509,269 (Tiitola); and claim 17 as being obvious in view of McGrath *et al.* in light of U.S. Patent 6,273,835 (Battis *et al.*).

1. Patentability of claims 1 to 6, 8 to 10, 13 to 17

Claim 1 has been amended in order to more specifically define the distinctive features of the present invention that are neither disclosed nor suggested by the cited references.

The Applicants bring the Examiner's attention to the following highlighted features of amended claim 1 that are neither disclosed nor suggested by the cited references:

1. A hockey stick blade with a shank and a blade element having a front external surface and a rear external surface, said hockey stick blade comprising:
 - (a) a core made of thermo-expandable foam and extending along a longitudinal axis;
 - (b) a first layer of fibers at least partially wrapping over said core; said first layer of fibers being impregnated with a suitable resin;
 - (c) a second layer of fibers at least partially wrapping over said first layer of fibers, said second layer of fibers being impregnated with a suitable resin; and
 - (d) a sheet covering at least partially said second layer of fibers, said sheet **being made of thermoplastic material devoid of fibers and selected from the group consisting of polyethylene, polyurethane, polypropylene, polyester, polystyrene, polyvinyl chloride and cellulose acetate**, said sheet of thermoplastic material forming part of one of said front and rear external surfaces of said blade element **and having a hardness sufficient for increasing the impact resistance of said blade.**

Lallemand

In Lallemand, the superposed meshes 1, 2, 3 may be made from carbon, aramide, glass E, glass R, polyethylene HP (Dyneema), quartz fibers, etc. These meshes are impregnated with resin (such as pure or modified epoxy resin or thermoplastic resin) by using injection resin transfer molding (Resin Transfer Molding):

“According to one embodiment of the stick, the first and the third meshes 1 and 3 are made of carbon fibers, the second mesh 2 being made from a mixture of carbon, quartz and polyethylene fibers (for example fibers of the mark DYNEEMA), for example in a proportion of 50%, 25% and 25%.

[...]

When the covering operation is complete, the impregnation of the stick is performed by means of a resin, such as pure or modified epoxy resin or a thermoplastic resin, or any other particularly fluid resin, by using the known process for impregnating fibers by low-pressure injection RTM (Resin Transfer Moulding), consisting of moulding by resin transfer.”

The cured blade of Lallemand therefore comprises a foam core covered by meshes 1, 2, 3 that are impregnated with a suitable resin.

Nowhere in Lallemand does the inventor refer to a sheet made of thermoplastic material covering the layers of fibers, as recited in claim 1. *A fortiori*, nowhere in Lallemand does the inventor indicate or suggest that the thermoplastic sheet is selected from the group consisting of polyethylene, polyurethane, polypropylene, polyester, polystyrene, polyvinyl chloride and cellulose acetate, as recited in claim 1.

Moreover, since the fibers are impregnated with a suitable resin in Lallemand, this reference does not disclose nor suggest a hockey stick blade comprising a sheet made of thermoplastic material devoid of fibers, as recited in claim 1. Indeed, in the claimed hockey stick blade, the thermoplastic sheet is a different part from the fibers layers.

For ease of reference, Figures 2 and 10 illustrating the core 30, first layer of fibers made of fibers braids 48, 50, 52, second layer of fibers made of fibers braid 54, and the front and rear thermoplastic sheets 62, 64 are reproduced hereinbelow:

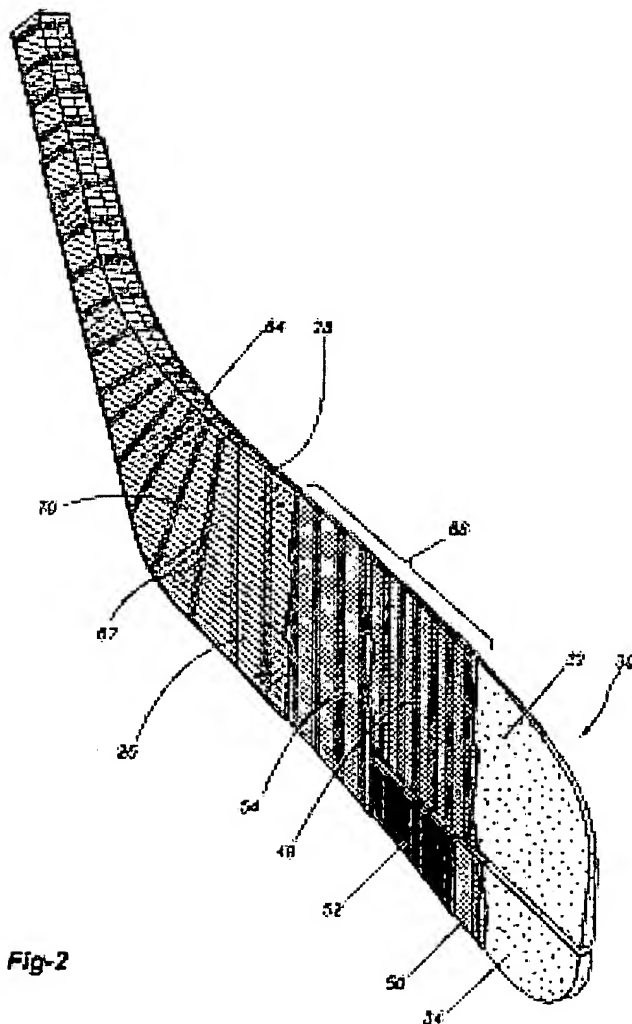


Fig-2

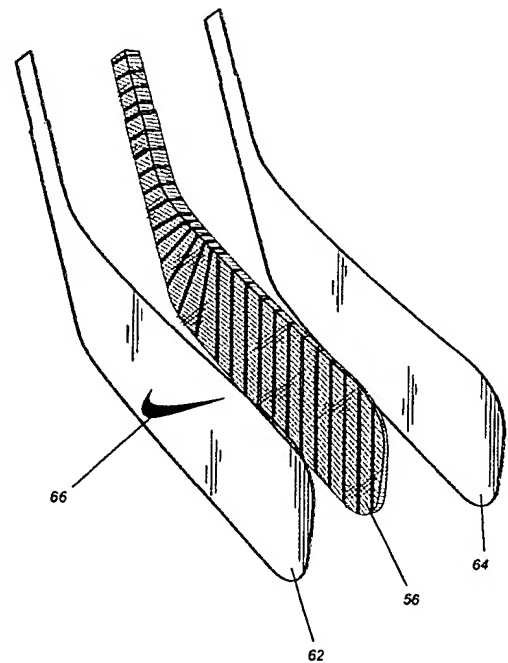


Fig-10

Furthermore, the Applicants have recognized that the impact resistance of the hockey stick blade is increased by covering the layers of fibers with a sheet of thermoplastic material. The Applicants have therefore made a significant advance in the art of hockey blade construction by recognizing that the impact resistance of the blade is increased by covering at least partially the second layer of fibers with a sheet of thermoplastic material such that this sheet of thermoplastic material forms part of one of the front and rear external surfaces of the blade.

It is therefore submitted that Lallemand is completely silent concerning the possibility of providing a hockey stick blade with a sheet of thermoplastic material having a hardness sufficient for increasing the impact resistance of said blade, as recited in claim 1.

McGrath et al

In McGrath *et al.*, the blade comprises layers 510 or plies 520 that are made of fibers pre-impregnated with epoxy:

“In order to avoid manufacturing expenses related to transferring the resin into the mold, the matrix material may be pre-impregnated into the fibers or filaments, plies 520 or layers 510 prior to the uncured blade assembly being inserted into the mold and the mold being sealed. In addition, in order to avoid costs associated with employment of woven sleeve materials, it may be preferable that the layers 510 be comprised of one or more plies 520 of non-woven uni-directional fibers. Applicants have found that a suitable material includes uni-directional carbon fiber tape pre-impregnated with epoxy, manufactured by Hexcel Corporation of Salt Lake City, Utah, and also S & P Systems of San Diego, Calif.” [McGrath *et al.* , page 29, lines 27 to 35]

Nowhere in McGrath *et al.* do the inventors refer to a sheet made of thermoplastic material covering the layers of fibers, as recited in claim 1. *A fortiori*, nowhere in McGrath *et al.* do the inventors indicate or suggest that the thermoplastic sheet is selected from the group consisting of polyethylene, polyurethane, polypropylene, polyester, polystyrene, polyvinyl chloride and cellulose acetate, as recited in claim 1.

Moreover, since the fibers are impregnated with epoxy in McGrath *et al.*, this reference does not disclose nor suggest a hockey stick blade comprising a sheet made of thermoplastic material

devoid of fibers, as recited in claim 1.

Lastly, McGrath *et al.* is completely silent concerning the possibility of providing a hockey stick blade with a sheet of thermoplastic material having a hardness sufficient for increasing the impact resistance of said blade, as recited in claim 1.

In view of the above, the Applicants submit that claim 1 is patentable over the cited references and allowance of claim 1 is earnestly solicited. Because claims 2 to 6, 8 to 10 and 13 to 17 depend directly or indirectly from claim 1 and include by reference all of the features recited in claim 1, these claims are also patentable and allowance of claims 2 to 6, 8 to 10 and 13 to 17 is earnestly solicited.

2. Patentability of claim 31

In the Final Action, the Examiner rejected claim 31 as defining an invention that would have been obvious in view of Lallemand.

Claim 31 has been amended in order to more specifically define the distinctive features of the present invention that are neither disclosed nor suggested by the cited references. The Applicants bring the Examiner's attention to the following highlighted features of amended claim 31 that are neither disclosed nor suggested by the cited references:

31. A hockey stick blade with a shank and a blade element having a front external surface and a rear external surface, said hockey stick blade comprising:
- (a) a core made of thermo-expandable foam and extending along a longitudinal axis;
 - (b) a first layer of fibers at least partially wrapping over said core; said first layer of fibers being impregnated with a suitable resin;
 - (c) a second layer of fibers at least partially wrapping over said first layer of fibers, said second layer of fibers being impregnated with a suitable resin; and
 - (d) front and rear sheets covering at least partially said second layer of fibers, **said front and rear sheets being made of thermoplastic material devoid of fibers and selected from the group consisting of polyethylene, polyurethane, polypropylene, polyester, polystyrene, polyvinyl chloride and cellulose acetate**, said front and rear thermoplastic sheets forming part of said respective front and rear external surfaces of said blade element **and having a hardness of**

at least 73D for increasing the impact resistance of said blade.

Nowhere in Lallemand does the inventor refer to front and rear sheets made of thermoplastic material covering the layers of fibers, as recited in claim 31. *A fortiori*, nowhere in Lallemand does the inventor indicate or suggest that the thermoplastic sheets are selected from the group consisting of polyethylene, polyurethane, polypropylene, polyester, polystyrene, polyvinyl chloride and cellulose acetate, as recited in claim 31.

Moreover, since the fibers are impregnated with a suitable resin in Lallemand, this reference does not disclose nor suggest a hockey stick blade comprising rear and front sheets made of thermoplastic material devoid of fibers, as recited in claim 31.

Lastly, Lallemand is completely silent concerning the possibility of providing a hockey stick blade with front and rear thermoplastic sheets having a hardness of at least 73D for increasing the impact resistance of said blade, as recited in claim 31.

Claim 31 is therefore patentable over Lallemand and allowance of this claim is earnestly solicited.

3. Patentability of claims 33 and 34

The Applicants bring the Examiner's attention to the following highlighted features of claim 33 that are neither disclosed nor suggested by the cited references:

33. A hockey stick blade with a shank and a blade element having a front external surface and a rear external surface, said hockey stick blade comprising:
- (a) a core made of thermo-expandable foam and extending along a longitudinal axis;
 - (b) a first layer of fibers at least partially wrapping over said core; said first layer of fibers being impregnated with a suitable resin;
 - (c) a second layer of fibers at least partially wrapping over said first layer of fibers, said second layer of fibers being impregnated with a suitable resin; and
 - (d) a sheet covering at least partially said second layer of fibers, **said sheet being made of thermoplastic material devoid of fibers and selected from the group consisting of polyethylene, polyurethane, polypropylene, polyester, polystyrene, polyvinyl chloride and cellulose acetate**, said sheet of

thermoplastic material forming part of one of said front and rear external surfaces of said blade element **and having a hardness sufficient for increasing the impact resistance of said blade, and wherein said sheet of thermoplastic material has an indicia.**

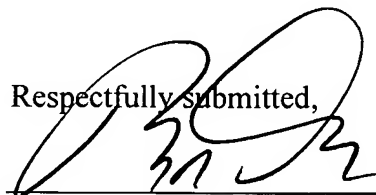
Allowance of claim 33 is therefore earnestly solicited. Because claim 34 depends from claim 33 and includes by reference all of the features recited in claim 33, claim 34 is also patentable and allowance of this claim is earnestly solicited.

CONCLUSION

It is respectfully submitted that all rejections and objections raised by the Examiner have been addressed and overcome by the present response and each of pending claims 1 to 6, 8 to 10, 13 to 17, 31, 33 and 34 is in condition for allowance. Allowance of these claims and issuance of the Notice of Allowance are respectfully solicited.

If the claims of the application are not believed to be in full condition for allowance, for any reason, the Applicant respectfully requests the constructive assistance and suggestions of the Examiner in drafting one or more acceptable claims pursuant to MPEP § 707.07(j) or in making constructive suggestions pursuant to MPEP § 706.03 so that the application can be placed in allowable condition as soon as possible and without the need for further proceedings. The Examiner is invited to contact the Applicant's undersigned agent to expedite the examination of the application if issues remain outstanding.

Respectfully submitted,



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